

an orthoneurous visceral commissure, upon which we may imagine, to be concise, two symmetrical pallio-branchial ganglia, innervating symmetrically the gill and the mantle of the same side. The whole of this symmetrical apparatus has been transported, owing to the peculiar mode of growth, to the right and towards the front, and has finally come to occupy a symmetrical dorsal position, as we still find it in *Fissurella*. The primitive right gill is therefore found to the left, and the left to the right; moreover, since the gills carry with them the ganglia which innervate them, the visceral commissure became chistoneurous. Later on the right gill (primitive left) atrophied, and Gastropods were produced provided with the single left gill (primitive right) such as we find in the great majority of the Prosobranchia and also in *Acteon*.

But then there took place a displacement of the gill in precisely the opposite direction. The persisting left gill returned towards the rear and to the right, carrying with it its ganglion (the supra-intestinal) and the supra-intestinal commissural branch, which came to lie on the right side of the œsophagus.

The branchial ganglion (primitively supra-intestinal) probably became fused with the right secondary pallial ganglion; it no longer sent nerve-branches into the left portions of the mantle, which were too far off, but it innervated the regions of this organ which are situated to the right, that is to say in the neighbourhood of the gill. The subintestinal ganglion, having become useless, atrophied altogether, at the same time as was developed the left secondary pallial ganglion, which carried to the left of the œsophagus the subintestinal commissural branch, and assumed the sole control of the innervation of the left portions of the mantle (*Acera bullata* and aquatic Pulmonata). In the other Opisthobranchiate forms the left secondary pallial ganglion has approached much nearer to the visceral ganglion or has even become fused with it. In all cases the visceral commissure has become more or less decidedly orthoneurous, and this arrangement has enabled the nervous centres situated upon the commissure to approach one another very nearly, and even to fuse together (Nudibranchia, certain Pteropoda, and terrestrial Pulmonata). The Pulmonata are directly connected with the Actæonidæ by their branchiferous (*Siphonaria*) and operculate (*Amphibola*) species, and there can no longer be any question of establishing in the class Mollusca two parallel series independent one of the other.—*Comptes Rendus*, t. cxvi. no. 2 (January 9, 1893), pp. 68-70.

*On the Branchial Sense-Organs of the Patellidæ.*

By Dr. J. THIELE, of Dresden.

When I was examining some time ago a series of transverse sections which I had prepared of a specimen of *Patina pellucida*, my attention was attracted by a button-shaped projection of the epithelium at the sides of the body between the foot and mantle which could hardly be anything else than a sense-organ. For the moment

I thought of an equivalent to the lateral organs of Rhipidoglossa, but then noticed that the organ was present only in the foremost portion of the lateral mantle-chamber, and I therefore assumed that a connexion existed with the rudimentary gills or organs of Spengel. The mode of preservation of the animal under investigation was not such as to enable a clear idea of the innervation to be obtained, and therefore in a figure of *Patinella deaurata* recently published with another object ("Beiträge zur Kenntnis der Mollusken.—I. Ueber das Epipodium," Zeitschr. f. wiss. Zool. 53 Bd., Taf. xxiii. fig. 3), which shows a thickened streak at the spot indicated, I had designated this simply as "sense-organ" ("Sinnesorgan").

A short time ago I received some well-preserved specimens of *Patina pellucida* from Heligoland, and in a series of sections I have found the sense-organ again very distinctly, and have determined its innervation. The nerve, which runs beneath the streak of sensory epithelium, proceeds from the olfactory ganglion of Spengel; it is on the whole feebly developed and not altogether easy to distinguish between the fibres of the retractor muscle, though most distinct in front. The epithelial band is fairly broad at the spot where it encircles the retractors in front; from this point it becomes still broader towards the middle, and the cells become flatter, while at the outer side it soon narrows considerably, while the columnar cells diverge fan-wise; at this spot it differs most from the surrounding epithelium, though the entire streak exhibits the characteristics of sensory epithelium in a well-marked degree.

With reference to the dissemination of this organ, it may be remarked that it is possible that it occurs in all Patellidæ, excluding *Acmata* and *Lepeta*, since I have traced it in *Patella cærulea* in sections and have seen it macroscopically in *Patinella*, two forms which are not far distant from the terminal points of the phyletic developmental series.

Neither Spengel ("Die Geruchsorgane und das Nervensystem von Mollusken," Zeitschr. f. wiss. Zool. 35 Bd.) nor Bernard ("Organes palléaux des Prosobranches," Ann. Sc. Nat. vii. 9), who has recently minutely investigated the branchial sense-organs of the Prosobranchia, have noticed this prolongation of them at the sides of the body in Patellidæ, but have only observed the portion which is in immediate connexion with the nuchal papillæ, the rudiments of the Zygobranch gills. Bernard even expressly states with regard to *Patina pellucida* that "the organ of Spengel is situated entirely behind the ganglion." The course of the organ as described above appears to me to be not without importance, and I therefore wished to give a provisional account of the fact; I shall revert to it later on in greater detail.—*Zoologischer Anzeiger*, xvi. Jahrg., no. 412 (February 13, 1893), pp. 49, 50.

*On Cirripedes and other Crustaceans commensal with Mediterranean Turtles.* By MM. E. CHEVREUX and J. DE GUERNE.

It is seldom that the opportunity is presented to zoologists of observing the pelagic Vertebrates at sea under the normal conditions of their existence. Accordingly on board the 'Hirondelle,'